



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANTS: Ulrich Reiners et al.  
Application NO.: 09/851,460  
FILED: 8 May, 2001  
FOR: PAPER-LIKE AND THERMO-FORMABLE MULTILAYER  
BARRIER FILM

**DECLARATION UNDER 37 C.F.R. § 1.132**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

I, Bernig Walter, hereby declare as follows:

1. I am a citizen of Germany, residing at Rottachbergweg 5  
87549 Rettenberg
2. I studied chemistry at the Fachhochschule of Aalen and received a degree in  
the field chemical engineering in the year 1977.
3. Since 1.4.1987 I have been employed as a project engineer/manager R&D in  
the field of Research and Development films for deep draw applications and  
shrink bags for shrink bag applications and I am still working in this field for  
the company of Convenience Food Systems, Kempten, Germany, an  
affiliated company of Convenience Food Systems B.V.
4. The following tests were made under my supervision and control:

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# **I. Films according to the US patent application 09/851,460**

## **la. Test**

A film with six layers is produced according to the blown film coextrusion procedure. The sequence of the layers is: AA`BCDE.

Layer A consists of: 53 weight-% of a calcium carbonate with an average particle size of 4,5  $\mu\text{m}$  and 47 weight-% of a homopropylene with a melting index of 2,1 g/10 min.

Layer A` consists of: 100 weight-% of a LDPE with a melting index of 0,85 g/10 min and a density of 0,922 g/cm<sup>3</sup>.

Layer B consists of: 100 weight-% of an acid-modified ethylene methacrylate copolymer with a melting point of 108<sup>0</sup>C and a melting index of 3,0 /10 min and functions as adhesive layer.

Layer C consists of: 100 weight-% of an ethylene vinylalcohol copolymer with an ethylene percentage of 38 mol-% and a melting index of 5,5 g /10 min and functions as barrier layer.

Layer D consists of: 100 weight-% of an acid-modified polypropylene with a melting index of 3,5 g/10 min and functions as adhesive layer.

Layer E consists of: 87 weight-% of a polyethylene with a density of 0,9250 g/cm<sup>3</sup> and a melting index of 2,0 g /10 min and 13 weight-% of a polybutylene with a melting index of 1,0 g /10 min and functions as sealing layer.

The thicknesses of the layers are:

Layer A	200 $\mu\text{m}$
Layer A'	10 $\mu\text{m}$
Layer B	3 $\mu\text{m}$
Layer C	4 $\mu\text{m}$
Layer D	3 $\mu\text{m}$
Layer E	20 $\mu\text{m}$ .

The total thickness of the multilayer film is 240  $\mu\text{m}$ . The ratio of the thickness of the unfilled layers to that of the filled layer is 1:5

#### **lb. Test**

In this text the layers of the multilayered film are composed as in Test Ia.

The thickness of each layer is:

Layer A	60 $\mu\text{m}$
Layer A'	15 $\mu\text{m}$
Layer B	3 $\mu\text{m}$
Layer C	4 $\mu\text{m}$
Layer D	3 $\mu\text{m}$
Layer E	23 $\mu\text{m}$ .

The total thickness of the multilayer film is 109  $\mu\text{m}$ . The ratio of the thickness of the unfilled layers to that of the filled layer is 1:1,27

## II. Comparison films

### IIa. Test

The film used has the same composition of the layers as described in Test Ia.

The thicknesses of the layers, however, are:

Layer A	350 $\mu\text{m}$
Layer A'	10 $\mu\text{m}$
Layer B	3 $\mu\text{m}$
Layer C	4 $\mu\text{m}$
Layer D	3 $\mu\text{m}$
Layer E	20 $\mu\text{m}$ .

The total thickness of the multilayer film is 390  $\mu\text{m}$ . The ratio of the thickness of the unfilled layers to that of the filled layer is 1:8,27

### IIb. Test

The film used has the same composition of layers as in Test Ia.

The thicknesses of the layers, however, are as follows:

Layer A	60 $\mu\text{m}$
Layer A'	23 $\mu\text{m}$
Layer B	3 $\mu\text{m}$
Layer C	4 $\mu\text{m}$
Layer D	3 $\mu\text{m}$
Layer E	23 $\mu\text{m}$ .

The total thickness of the multilayer film is 116  $\mu\text{m}$ . The ratio of the thickness of the unfilled layers to that of the filled layer is 1:1,07.

The melting indices cited in the Tests were determined according to ASTM 1238.

### III. Properties of the films according the Tests Ia to IIb

Film according to	range of thermo-forming (°C)	packaging speed (cycles per minute)*	appearance of the film
Test I a	125 to 145	12,5	paper-like
Test II a	145 to 156	10,4	paper-like
Test I b	115 to 145	12,8	paper-like
Test II b	115 to 145	12,8	plastic

#### \* Determination of the packaging speed

##### Test IVa

Packaging articles (trays) made of the inventive film according to Test Ia are formed at 135°C for 15 min on a FFS machine. The process is interrupted, the tray insert of the machine is changed and trays with another dimension made of the inventive film according to Ia are produced again at 135°C for 15 min. Then trays made of the inventive film according to Test Ib are formed at 135°C for 15 min. The process is interrupted, the tray insert of the machine is changed and trays with another dimension made of the inventive film according to Test Ib are produced again at 135°C for 15 min.

##### Test IVb

Packaging articles (trays) made of the film according to Test IIa are formed at 145°C for 15 min on a FFS machine. The process is interrupted, the tray insert of the machine is changed and trays with another dimension made of the film according to Test IIa are produced again at 145°C for 15 min. Than trays made of the film according to

Test IIb are formed at 135°C for 15 min. The process is interrupted, the tray insert of the machine is changed and trays with another dimension made of the film according to Test IIb are produced again at 135°C for 15 min.

The packaging speed is determined as the number of produced packaging articles in one hour under the mentioned conditions.

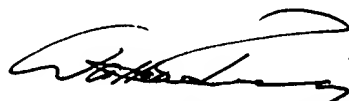
## V. Results

The Tests show that for the combination of advantageous properties of the film, as packaging material especially for the combination of the paper-like appearance and the very good thermoforming properties, the ratio of the total thickness of the unfilled layers to the thickness of the filled layer is essential. The comparison of Test IVa with Test IVb indicate that the packaging speed for the films according to the US patent application No. 09/851,460 is higher than for films with a ratio of the total thickness of the unfilled layers to the thickness of the filled layer outside the inventive range.

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true, and further, these statements were made with the knowledge that willful false statements and the like, so made, are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent application or any patent issued thereon.

7. 1. 2002

(Date)



(Bernig, Walter)